Contribution ID: **5** Type: **Contributed talk**

Unveiling the magnetized path of massive star formation with MAGMA

Wednesday 7 May 2025 16:40 (20 minutes)

Magnetic fields play a dynamically crucial role in massive star formation. Models of massive star formation suggest that the magnetic field could significantly prevent fragmentation, cloud and core collapse, and influence the formation of accretion disks and jets. However, there are many aspects that ultimately lead to the formation of massive stars and star clusters that still remain uncertain, including the relative importance of magnetic fields in setting the large-scale initial conditions, fragmentation and infall properties. Two possible methods to make progress in resolving these open questions are (i) to conduct multi-scale studies to characterise the magnetic field properties (morphology, strength and dynamical importance) from cloud to core to disk/jet scales and/or (ii) to statistically probe the magnetic field properties of a large sample of star-forming regions in different environments, which can help not only to better understand the its role in crucial processes such as star formation, but also to gain insights into their origin and evolution. In this talk I will summarise the preliminary results of the MAGnetic field in MAssive star formation (MAGMA) survey, which combines both methods by accurately characterising the magnetic field properties from cloud to disk scales over a statistically significant sample of high-mass star-forming regions. These preliminary results have already provided crucial insights into the role and relative importance of the magnetic field in high-mass star formation.

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Session Classification: Session 3